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CHILDHOOD SEXUAL ABUSE AND ABNORMAL PERSONALITY: A POPULATION-BASED STUDY

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ABSTRACT (243 words)

Background. Childhood sexual abuse has been shown to be a risk factor for personality disorder. However, no previous studies have examined whether associations exist between sexual abuse and abnormal personality as measured both categorically and dimensionally. Such enquiry would more fully illuminate the impact of childhood sexual abuse on adult personality.

Method. Using a large nationally representative sample, we set out to examine associations between childhood sexual abuse and categorically-defined personality disorder. We also examined associations between childhood sexual abuse and the five dimensions of personality (openness to experience, conscientiousness, extraversion, agreeableness and neuroticism). 1520 young adults were interviewed to determine the prevalence of sexual abuse occurring before age 16 years. 1469 participants completed a dimensional measure of personality and 1145 had an informant-based personality disorder assessment.

Results. Personality disorder was independently associated with repeated childhood sexual abuse (fully adjusted odds ratio 1.9; 95% CI: 1.1-3.4). Repeated sexual abuse was also associated with higher neuroticism and lower agreeableness (p values for both < 0.001). Adjusting for the effects of potential confounders and mediators, including earlier symptoms of anxiety and depression, had little impact on the strength of associations.

Conclusions. We conclude that repeated childhood sexual abuse is independently associated with categorically-defined personality disorder, and also with higher neuroticism and lower agreeableness. Our findings suggest that if a dimensional classification of personality

disorders is adopted in future classification systems, there might be meaningful continuity with previous aetiological research conducted using the current categorical system.

INTRODUCTION

Childhood maltreatment has been shown to be a longitudinal risk factor for personality disorder (PD) in young adulthood (Johnson *et al.* 1999; Widom *et al.* 2009). Moreover, childhood sexual abuse, physical abuse and neglect might be differentially associated with PDs. There is evidence to suggest that an independent longitudinal association exists between childhood sexual abuse and PD (Johnson *et al.* 1999; Spataro *et al.* 2004). However, previous studies have not used standard assessments for PD, thus limiting the generalisability of their findings. In addition, the effect of childhood sexual abuse on personality dimensions has not been rigorously researched. This is important for two reasons. Firstly, PD represents the extreme end of personality disturbance and the broader effects of childhood sexual abuse on adult personality are unclear. Secondly, it is likely that a dimensional approach will be introduced to the classification of abnormal personality in the fifth edition of Diagnostic & Statistical Manual (DSM-V) (Skodol and Bender, 2009). However, we do not know whether associations between childhood risk factors and categorically-defined PD are accompanied by meaningful associations between the same risk factors and dimensional measures of personality.

With these issues in mind, we set out to examine associations between childhood sexual abuse and abnormal personality as measured both categorically and dimensionally, in a large nationally representative sample of young adults. We wished to test the hypothesis that if categorical associations were detected, they would be paralleled by associations between

childhood sexual abuse and agreeableness and neuroticism, the two personality dimensions which typify all personality disorders (Saulsman and Page, 2004).

METHODS

DESIGN AND SAMPLE

Between 1992 and 2003, an eight-wave cohort study of adolescent and young adult health in the state of Victoria, Australia was carried out. This report concerns data collected in the eighth wave (average age 24 years). The details of this study have been previously described (Patton *et al.* 1998). We followed standard data collection protocols approved by the internal review boards of Victoria's Royal Children's Hospital's Ethics in Human Research Committee. Active written parental consent for participation was required at the study outset and verbal assent was also required from each participant.

The cohort was defined in a two-stage cluster sample, in which two classes were randomly selected from each of 44 schools drawn from a stratified frame of schools (total number of students 60,905). One class from each school entered the cohort in the latter part of the ninth school year, corresponding to age 14-15 years (wave 1) and the second class six months later, early in the tenth school year, corresponding to age 15-16 years (wave 2). Participants were subsequently reviewed at a further four six-month intervals during the teens (waves 3 to 6) with two follow-up waves in young adulthood at the ages of 20-21 years (wave 7) and 24-25 years (wave 8). In wave 8, from a total sample of 1943 students interviewed at previous waves, 1520 young adults (78%) were interviewed. Interviewing took place between May 2001 and March 2003. Reasons for non-completion at wave 8 were refusal (n=269), not contactable (n=150) and death (n=4).

MEASURES

The following covariates were measured: incomplete secondary schooling i.e. having left school before the final possible year (year 12); having attended a rural school at study inception; having been born in a country other than Australia; parental divorce or separation by wave 6; parental educational status; parental cigarette smoking. Symptoms of depression and anxiety were assessed from waves 1 to 7 using the computerised revised Clinical Interview Schedule (CIS-R) (Lewis *et al.* 1992). Total scores on the CIS-R were dichotomised with scores greater than 11 delineating a mixed depression-anxiety state at a lower threshold than syndromes of major depression and anxiety disorder, but where clinical intervention would be appropriate.

Childhood sexual abuse was measured retrospectively at 24 years (wave 8). We measured sexual abuse at this age because the state of Victoria has a statutory requirement to report all abuse in children less than 17 years to government services. To have informed parents and participants of this at the time carried a risk of selective refusal for those with abuse histories. Furthermore, participation in waves 1 to 6 required parental and school consent and inclusion of questions about sexual abuse might have reduced our response. By age 24, we felt participants would be sufficiently comfortable to encounter these questions, yet not as remote from the experience as to limit recall. We administered six items developed by (Martin *et al.* 1993). Participants were asked: “*before you were 16, did any adult or older person involve you in any unwanted incidents like: (i) inviting or requesting you to do something sexual; (ii) kissing or hugging you in a sexual way; (iii) touching or fondling your private parts; (iv) showing their sex organs to you; (v) making them touch you in a sexual way; (vi) attempting or having sexual intercourse*”. The response set was “never”, “once”, and “more than once”.

Childhood sexual abuse was classified according to the individual's most severe response to all abuse questions.

Personality disorder was assessed using the Standardised Assessment of Personality (SAP) (Pilgrim *et al.* 1993). This is a semi-structured interview conducted with an informant, either face-to-face or by telephone and assesses for the presence of all categories of DSM-IV personality disorder. Patients and informants differ in their descriptions of patients' usual personality. However, both self-report personality inventories and semi-structured interviews can be biased by the patient's acute state (Zimmerman, 1994) and it was for this reason that we chose to use an informant-based method. The overall level of inter-rater agreement for the presence of personality disorder on the SAP is excellent ($\kappa=0.76$), with a range between 0.60 and 0.82 for individual categories of personality disorder (Pilgrim *et al.* 1993). All wave 8 participants were asked to nominate a friend, with whom a telephone interview could be conducted, in order to assess the participant for the presence of PD. If the friend was unavailable or unable to be contacted, participants were reapproached for an alternative person. For the 1520 participants at wave 8, a total of 1145 (75%) informant interviews were conducted. Three hundred and four participants refused to nominate a friend. In the case of 45 participants, the informant refused or was non-contactable and in the case of 26 participants, friends were located, but did not respond to requests to be interviewed. The informants were friends or partners ($n=872$, 76%), relations ($n=253$, 22%) or spouses ($n=20$, 2%).

Personality dimensions were assessed using the NEO-Five Factor Inventory (NEO-FFI) (Costa, Jr. and McCrae, 1992). The NEO-FFI is a 60-item measure of the five domains of adult personality (openness to experience, conscientiousness, extraversion, agreeableness and

neuroticism). Participants were sent a paper version of the NEO-FFI with instructions on how to complete and return it. Those failing to do this were asked to complete the NEO-FFI during an interviewer-administered telephone interview. NEO-FFI data were obtained on 1469 participants (97% of wave 8 participants); 638 participants complied with the postal survey and 831 participants completed the telephone interview. Administration of the NEO-FFI by telephone did not adversely affect the internal consistency of the instrument; all five higher domains of the NEO-FFI showed good internal consistency, with Cronbach's α coefficients >0.70 .

STATISTICAL ANALYSES

Data analysis was undertaken using Stata 10 (Statacorp, 2008). We assessed associations between sexual abuse and background factors and personality measures using simple 2x3 Chi² tests with 2 degrees of freedom. Influential background factors were included as possible confounders in explanatory models for PD and NEO-FFI scores. Logistic regression models were used to assess the association between sexual abuse and PD. Differences in mean NEO-FFI dimension scores according to sexual abuse status were estimated using linear regression models.

Due to the computer-based data collection, there were few missing data for individuals within waves. However, 36% of respondents missed at least one wave of data collection in the adolescent phase (waves 1-6), leading to a potential bias in summary measures calculated from these data. Of particular relevance to this analysis, only 11 participants in wave 8 were missing on the measure of childhood sexual abuse, but, due to the complex nature of data collection, 51 were missing on the NEO-FFI and 375 on the SAP. Overall, all three measures were available for 1116 (73% of wave 8 participants). To address this, we used the method

of multiple imputation with five complete datasets created by imputation under a multivariable normal model. This model incorporated all the outcome and exposure variables of interest, along with the fixed covariates of sex, age, rural/urban residence, parental education and parental divorce/separation, using adaptive rounding for binary measures. Estimates of prevalence and (log) odds ratios were obtained within the multiple imputation framework by averaging across the imputed datasets with Wald-type confidence intervals obtained using Rubin's combination rules (Carlin *et al.* 2008). Linear trends were assessed by entering the 3-level sexual abuse variable (0,1,2) in logistic (for the PD outcomes) and linear (for NEO-FFI outcomes) regression models as an interval variable. Effect modification between the ordinal sexual abuse exposure and sex was assessed using the interaction effect Wald p-value. All confidence intervals (CI) use the 95% level.

RESULTS

The mean age of participants at wave 8 was 24.1 years (SD: 0.61). Fifty-one percent (n= 1000) of the sample was female and 14% (n= 264) was of non-Australian birth. The overall prevalence of DSM-IV personality disorders was 18.6% (CI: 16.5-20.7). The prevalence of DSM-IV PD was 8.3% (CI: 7.0-9.6) for Cluster A, 8.1% (CI: 6.8-9.4) for Cluster B and 9.8% (CI: 8.3-11.3) for Cluster C PD. Multiple PDs were common, with 56%, 57% and 45% of those with Cluster A, B and C respectively also being classified with at least one other PD from another cluster. Eighty-eight percent (CI: 87-90) of the sample reported no childhood sexual abuse. The prevalence of one reported episode of childhood sexual abuse was 5.7% (CI: 4.6-7.0) and of more than one reported episode was 6.1 % (CI: 5.0-7.4).

Associations of background factors with childhood sexual abuse are displayed in Table 1.

INSERT TABLE 1 ABOUT HERE

Reporting of childhood sexual abuse was significantly more common among females, the association being stronger for more than one report of abuse (Odds ratio (OR): 4.4; CI: 2.5-7.5). Childhood sexual abuse was also associated with parental failure to complete high school education, parental cigarette smoking and parental divorce/separation by wave 6 (when participants were aged 17 years).

Associations between sexual abuse before 16 years and personality disorder are displayed in Table 2.

INSERT TABLE 2 ABOUT HERE

Childhood sexual abuse was associated with having any PD (from Cluster A, B or C) with reports of repeated episodes of abuse resulting in at least a two-fold increased odds of both any PD and all three individual Cluster PDs. Adjustment for sex, parental education, divorce/separation, smoking status and earlier symptoms of anxiety and depression, had little impact on the strength of these associations. There was no evidence of a first order interaction of childhood sexual abuse with sex with any of the PD outcomes (minimum Wald interaction p-value 0.47).

Associations between childhood sexual abuse and the five NEO-FFI personality dimensions are displayed in Table 3.

INSERT TABLE 3 ABOUT HERE

Childhood sexual abuse was associated with higher neuroticism and lower agreeableness, with the association more evident with repeated episodes of abuse. Adjustment for sex, parental education, divorce/separation, smoking status and earlier symptoms of anxiety and depression had little impact on the differences in mean dimensional scores. Evidence of an association between childhood sexual abuse and openness was inconsistent as it was only apparent with single episodes and not with repeated episodes of abuse. There was some evidence for an interaction between childhood sexual abuse and sex, for the outcomes extraversion and neuroticism (both Wald p-values 0.05) but not for agreeableness, conscientiousness and openness (Wald p-values 0.37, 0.45 and 0.96 respectively). With both extraversion and neuroticism, the interaction effect pointed to more pronounced differences with increasing reports of abuse in males.

All models reported in tables 1 to 3 were repeated using only complete data and the general pattern of estimates was similar to those obtained by using imputed data.

DISCUSSION

In this large nationally representative sample of young adults, repeated childhood sexual abuse was associated with a two-fold increase in the odds for categorically defined PD and this association held for each PD cluster. There was clear evidence of a trend to higher risk of PD with increasing reports of sexual abuse. Those experiencing multiple episodes of abuse also differed substantially from those with no history of abuse, on agreeableness and neuroticism, the two personality dimensions usually linked to the various personality disorders (Moran *et al.* 2006; Saulsman and Page, 2004). Adjustment for background socio-demographic factors and for earlier symptoms of anxiety and depression had little effect on

the strength of the detected associations. Associations between PD or personality dimensions with report of a single episode of abuse were less consistent.

Approximately 12% of our sample reported one or more episodes of sexual abuse prior to the age of 16 years, with 6% of the sample reporting more than one episode. Females reported abuse more often than males (17% and 5% respectively). These findings are consistent with previously published research into the community prevalence of CSA. A recent meta-analysis of the prevalence of childhood sexual abuse in community samples reported that across 22 countries, approximately 7% of men and 19% of women had suffered some form of sexual abuse before the age of 18 years (Pereda *et al.* 2009). Consistent with the previous literature, we found an excess prevalence of sexual abuse among female participants and in addition, we identified parental correlates of childhood sexual abuse. The parents of those participants with more than one report of sexual abuse were more likely to be divorced or separated by the time the participant was 17 years, failed to complete their high school education and/or were cigarette smokers. Previous epidemiological research has failed to identify consistent socio-demographic correlates of childhood sexual abuse (Pereda *et al.* 2009) and to our knowledge, these associations have not been previously reported, although they were not central to our area of enquiry. Nonetheless, these additional associations might indicate important confounding variables of the associations that we detected and as such, we adjusted for these variables in the final models.

Several mechanisms might explain the association between childhood sexual abuse and personality abnormality. Childhood sexual abuse often emerges from a “nexus of adversity” (Mullen *et al.* 1996; Spataro *et al.* 2004) and as such, the detected associations might be confounded by other harmful exposures, such as low parental nurturing and physical abuse

(Johnson *et al.* 2006). Although we addressed the possibility of confounding by background demographic factors, we did not measure other forms of maltreatment and so cannot exclude these as possible confounders. Secondly, PD is associated with maladaptive parenting (Johnson *et al.* 2001); (Conroy *et al.* 2009) and in children whose biological parents were abusers, the association might reflect a genetic predisposition to personality abnormality. We did not measure parental mental disorder and were unable to distinguish (biological) parental abuse from non-parental abuse and so, cannot exclude this possibility. Thirdly, people with personality disorder might report sexual abuse more readily. Finally, childhood sexual abuse is also a risk factor for common mental disorder (Spataro *et al.* 2004) and the detected associations might reflect underlying co-morbidity. However, adjustment for earlier symptoms of depression and anxiety had little impact on the strength of the associations and we think that this is therefore an unlikely explanation.

Our study has a number of methodological strengths. First, we used a large sample that was representative of the general population, thus increasing the generalisability of our findings. Second, previous research in this area has relied on hospital records for case ascertainment (Spataro *et al.* 2004), or a non-standard rating of DSM-IV PD symptoms (Johnson *et al.* 1999). In this study, we used a reliable structured assessment of PD, which uses information derived from an informant. As such, the observed associations are unlikely to reflect information bias. We also measured personality using two different methods (self-report and informant), with consistent findings across both methods. Finally, we were able to minimise the effects of missing data by using multiple imputation.

Our findings need to be considered in the light of a number of limitations. First, we assessed childhood sexual abuse retrospectively at 24 years. As outlined in the Methods, we chose

this data collection procedure in response to the need to balance ethical and practical considerations. Retrospective assessment is common in studies of sexual abuse and has been shown to have a high specificity (Everson and Boat, 1989). Moreover there is evidence for substantial underreporting by sexually abused respondents (Hardt and Rutter, 2004) and support for the construct validity of retrospective self-report measures of sexual abuse (Widom and Morris, 1997). Secondly, we only recorded frequency of sexual abuse and did not measure the nature or severity of abuse, or other forms of physical and emotional abuse, all of which are likely to have an impact on the outcome. Thirdly, the Five Factor Model of personality (Digman, 1990) is likely to have floor and ceiling effects for some clinically salient traits and lacks other clinically relevant traits (e.g. peculiarity and compulsivity), which might lead to underestimation of personality pathology. Fourthly, although we gathered data on a number of parental characteristics, we did not measure parental psychopathology and were therefore unable to examine the potential effects of this on the detected associations. Finally, the prevalence of PD in our sample was higher than that reported in previous community surveys of all adults. However, it is consistent with the observation that PD prevalence declines with age (Samuels *et al.* 2002; Ullrich and Coid, 2009)

Despite being familiar to clinicians, the categorical approach to classifying personality disorder has major limitations. These include an inadequate scientific basis, excessive diagnostic co-occurrence and inadequate coverage of the range of personality pathology (Widiger and Simonsen, 2005). Taken together, our findings support the longitudinal association of multiple episodes of childhood sexual abuse with abnormal personality, whether measured categorically by informant, or dimensionally by self-report. Our findings also suggest that if a dimensional model for PDs is adopted in future classification systems,

there might be meaningful continuity with previous risk factor research conducted using the current categorical system.

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DECLARATION OF INTEREST

None

Table 1. Parental background factors and participant background factors by the number of reported episodes of childhood sexual abuse in 1520 cohort participants.

Background factor			Childhood sexual abuse			Chi square p-value (2 df)
			None (n=1340)	One report (n=87)	Two or more reports (n=93)	
Parent measures						
	N ¹		n ¹ (%) ²	n (%)	n (%)	
Divorce/separation by wave 6	No	1181	1061 (79)	62 (71)	58 (62)	<0.001
	Yes ³	339	279 (21)	25 (29)	35 (38)	
High school completion	At least one	1035	938 (70)	51 (59)	47 (51)	<0.001
	Neither ³	485	402 (30)	36 (41)	46 (49)	
Cigarette smoking	Neither	954	861 (64)	39 (45)	43 (46)	<0.001
	At least one	566	479 (36)	48 (55)	50 (54)	
Participant measures						
Sex	Male	696	660 (49)	19 (22)	17 (18)	<0.001
	Female ³	824	680 (51)	68 (78)	76 (82)	
Place of birth	Australia	1339	1181 (88)	78 (90)	80 (86)	0.75
	Other ³	181	159 (12)	9 (10)	13 (14)	
School location	Metropolitan	1122	989 (74)	59 (68)	75 (81)	0.15
	Rural ³	398	351 (26)	28 (32)	18 (19)	

¹ Frequencies obtained by averaging across the five imputed datasets

² Percent of childhood sexual abuse category with background category

³ Risk category of explanatory variable

Table 2 . Association between childhood sexual abuse before 16 years and personality disorder measured at 24 years (wave 8, n=1520).

Childhood sexual abuse before 16 years	N ¹	Personality disorder cluster at 24 years (wave 8)											
		Cluster-A (n ¹ =127)			Cluster-B (n=123)			Cluster-C (n=153)			Any PD (n=285)		
		n ² (%)	OR ³	(95% CI)	n (%)	OR	(95% CI)	n (%)	OR	(95% CI)	n (%)	OR	(95% CI)
No abuse	1340	100 (7)	1		97 (7)	1		127 (9)	1		235 (18)	1	
Unadjusted													
One episode	87	8 (9)	1.2	(0.47 to 2.9)	11 (13)	1.9	(0.94 to 3.8)	9 (10)	1.0	(0.48 to 2.3)	20 (23)	1.4	(0.79 to 2.4)
>1 episode	93	19 (21)	3.2	(1.9 to 5.7)	15 (16)	2.4	(1.3 to 4.6)	17 (18)	2.1	(1.2 to 3.7)	30 (32)	2.2	(1.3 to 3.8)
Linear trend test p-value				<0.001			0.002			0.02			0.001
Adjusted for background factors ⁴													
One episode	87	8 (9)	1.1	(0.43 to 2.6)	11 (13)	1.9	(0.96 to 3.9)	9 (10)	1.0	(0.45 to 2.2)	20 (23)	1.3	(0.75 to 2.2)
>1 episode	93	19 (21)	2.9	(1.6 to 5.3)	15 (16)	2.4	(1.2 to 4.7)	17 (18)	1.9	(1.1 to 3.5)	30 (32)	2.1	(1.1 to 3.7)
Linear trend test p-value				0.001			0.004			0.06			0.01
Adjusted for background factors and symptoms of anxiety & depression before 24 years ⁵													
One episode	87	8 (9)	1.0	(0.41 to 2.5)	11 (13)	1.9	(0.93 to 3.8)	9 (10)	0.94	(0.43 to 2.1)	20 (23)	1.2	(0.72 to 2.1)
>1 episode	93	19 (21)	2.7	(1.5 to 4.9)	15 (16)	2.3	(1.1 to 4.5)	17 (18)	1.8	(1.0 to 3.2)	30 (32)	1.9	(1.1 to 3.5)
Linear trend test p-value				0.003			0.007			0.11			0.02

¹ Frequencies and percentages obtained by averaging across the imputed datasets

² Frequency (percent) of each exposure category with personality disorder cluster

³ Odds ratios from logistic regression models

⁴ Adjusted for background factors: sex, parental education, parental divorce/separation and parental smoking

⁵ Adjusted for background factors (sex, parental education, parental divorce/separation and parental smoking) and any earlier CIS-R>11 (waves 1-7)

Table 3. Association between childhood sexual abuse before 16 years and NEO-FFI scores measured at 24 years (wave 8, n=1520).

Childhood sexual abuse before 16 years		NEO scores at 24 years									
		Agreeableness		Conscientiousness		Extraversion		Neuroticism		Openness	
		mean ¹	(95% CI)	mean	(95% CI)	mean	(95% CI)	mean	(95% CI)	mean	(95% CI)
No abuse	score	31.9	(31.7 to 32.2)	33.1	(32.8 to 33.5)	31.2	(31.0 to 31.4)	16.8	(16.6 to 17.0)	27.7	(27.4 to 28.1)
Unadjusted											
One episode	difference from no abuse	-0.6	(-1.7 to 0.6)	-0.8	(-2.2 to 0.6)	-0.2	(-1.4 to 1.1)	3.2	(1.4 to 5.0)	2.4	(1.0 to 3.9)
>one episode	difference from no abuse	-3.0	(-4.2 to -1.7)	0.7	(-0.6 to 2.1)	-1.6	(-2.9 to -0.4)	6.3	(4.6 to 8.1)	1.0	(-0.3 to 2.3)
	Linear trend p-value	<0.001		0.59		0.02		<0.001		0.009	
Adjusted for background factors ³											
One episode	difference from no abuse	-0.9	(-2.0 to 0.3)	-0.9	(-2.3 to 0.5)	0.0	(-1.3 to 1.3)	2.2	(0.4 to 4.0)	2.5	(1.1 to 4.0)
>one episode	difference from no abuse	-3.2	(-4.4 to -1.9)	0.6	(-0.7 to 2.0)	-1.4	(-2.7 to -0.1)	5.1	(3.3 to 6.8)	1.2	(-0.2 to 2.5)
	Linear trend p-value	<0.001		0.72		0.06		<0.001		<0.001	
Adjusted for background factors and symptoms of anxiety & depression before 24 years ⁴											
One episode	difference from no abuse	-0.6	(-1.8 to 0.5)	-0.7	(-2.1 to 0.7)	0.2	(-1.1 to 1.5)	1.6	(-0.2 to 3.4)	2.4	(1.0 to 3.9)
>one episode	difference from no abuse	-2.8	(-4.1 to -1.6)	1.0	(-0.4 to 2.3)	-1.1	(-2.4 to 0.2)	4.2	(2.5 to 5.9)	1.0	(-0.4 to 2.3)
	Linear trend p-value	<0.001		0.38		0.16		<0.001		0.013	

¹ Means obtained by averaging NEO-FFI scores across the imputed datasets² P-value from regression models with NEO-FFI scores as outcome and CSA as explanatory variable³ Adjusted for background factors: sex, parental education, parental divorce/separation and parental smoking⁴ Adjusted for background factors (sex, parental education, parental divorce/separation and parental smoking) and any earlier CIS-R>11 (waves 1-7)

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